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WORK PLAN FOR EVALUATION OF TANK AND SUMP LOCATIONS WITH ORGANIC COMPOUNDS IN THE SOIL AT THE DOUGLAS AIRCRAFT FACILITY (C6), TORRANCE, CALIFORNIA
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PRIVILEGED AND CONFIDENTIAL
ATTORNEY WORK PRODUCT

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(L-ABC/DWP-C6)

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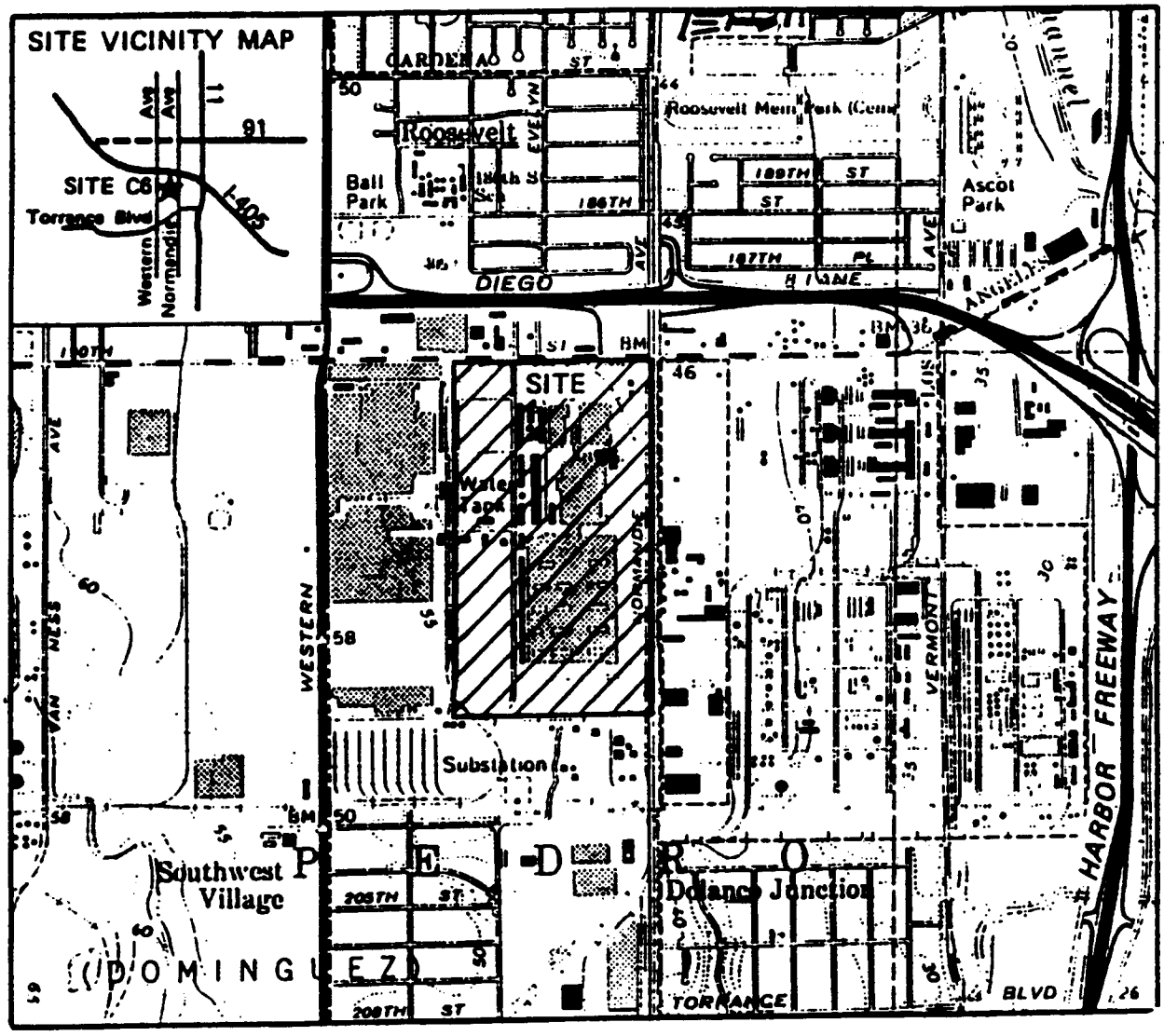
WORK PLAN FOR EVALUATION OF TANK AND SUMP LOCATIONS WITH ORGANIC COMPOUNDS IN THE SOIL AT THE DOUGLAS AIRCRAFT FACILITY (C6), TORRANCE, CALIFORNIA

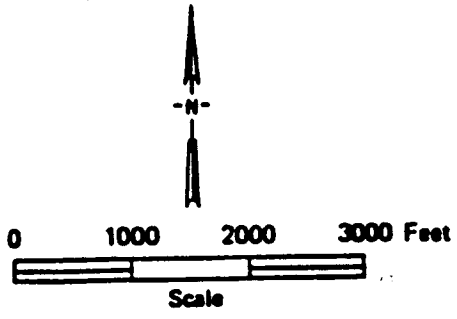
1.0 INTRODUCTION

The purpose of this work plan is to present Woodward-Clyde Consultants' (WCC) approach to evaluating tank and sump locations where organic compounds were found in the soil at the Douglas Aircraft Company's Torrance (C6) facility (see Figure 1 for site location map). The locations were identified during the Phase III drilling program conducted in August 1987. The Phase III program was designed to evaluate whether releases into the soil had occurred in the past from the underground tank systems and sumps at the facility, by sampling the soil adjacent to, and underneath the tanks and sumps.* Results from this investigation were presented and discussed in the WCC report "Phase III Drilling Program at Douglas Aircraft Company's Torrance (C6) Facility" dated 16 December 1987.

Laboratory results from the Phase III drilling activities indicated the presence of organic compounds in the soil at six of the 19 tanks and sumps investigated during the Phase III drilling program. Tanks 2T, 4T, 10T, 15T, and 17T and Sump 22S were identified as locations with organics in the soil. Table 1 presents the petroleum hydrocarbon concentrations found and the corresponding depths at which the soil samples were collected. In Table 2 the volatile organic chemical concentrations are presented with the corresponding



C6 FACILITY



Project: DOUGLAS AIRCRAFT CO. **Project No:** 41863A	C6 FACILITY LOCATION MAP	Fig. 1

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TABLE 1- SUMMARY OF HYDROCARBON COMPOUNDS FOUND AT THE C6 FACILITY.

Tank/Sump Number	Boring I.D.	Soil Depth Analyzed (ft)	Gasoline mg/kg (ppm)	Kerosene mg/kg (ppm)	Diesel Fuel mg/kg (ppm)	Mineral Spirits mg/kg (ppm)	C9-C30 Hydrocarbons mg/kg (ppm)
2 T	2TW	5	ND	ND	ND	ND	ND
		10	170	ND	ND	ND	ND
		15	24000	ND	ND	ND	ND
		20	ND	ND	ND	ND	ND
4 T	4TW	0	ND	ND	ND	ND	ND
		5	42	ND	ND	ND	ND
22 S	22SB	5	ND	ND	ND	ND	1400
		10	ND	ND	ND	ND	ND
		15	ND	ND	ND	ND	ND
Detection Limit (ppm)-			10	10	10	10	100

NOTE: D.L.- Detection Limit
ND - Not Detected

TABLE 2 - SUMMARY OF VOLATILE ORGANIC COMPOUNDS AT THE C6 FACILITY.

Tank/Sump Number	Boring I.D.	Analyzed Soil Depth (ft)	(MEK) 2-Butanone mg/kg (ppm)	1,1,1-TCA mg/kg (ppm)	TCE mg/kg (ppm)	Toluene mg/kg (ppm)	Ethylbenzene mg/kg (ppm)	Total Xylenes mg/kg (ppm)	(MIBK) 4-Methyl-2-Pentanone mg/kg (ppm)	1,4-Dioxane mg/kg (ppm)
10 T	10TW	10	ND	ND	ND	(15)	ND	ND	ND	ND
		15	ND	ND	ND	ND	ND	ND	ND	ND
		20	ND	ND	ND	(13)	ND	ND	ND	ND
15 T	15TB	10	(570)	ND	ND	(56)	(11)	(110)	ND	ND
		15	160	27	10	870	41	460	ND	ND
		20	1800	38	94	6300	180	1300	ND	ND
17 T	17TB	5	ND	ND	ND	ND	ND	ND	ND	ND
		10	ND	(36)	ND	(8)	ND	ND	ND	ND
		20	ND	(13)	ND	(7)	ND	ND	ND	(14)
		30	810	ND	ND	ND	ND	ND	840	ND
Detection Limit- (ppm)			50	5	5	5	5	5	30	D.L.-5
- (ppb)			(50)	(5)	(5)	(5)	(5)	(5)	(30)	(5)

NOTE: D.L.- Detection Limit
ND - Not Detected
( ) - Concentration in ug/kg (ppb)

depths at which the soil samples were analyzed. Brief descriptions of the tanks and sumps where subsurface ~~leakage~~ was found are presented as follows:

- Tank 2T is a 37+ year old, 4,000 gallon gasoline tank located near the southeast corner of Building 20 (see Figure C6-2 in Appendix A). Organic compounds were found at depths of 10 and 15 feet with concentrations ranging from 170 to 24,000 mg/kg (ppm). Organic compounds were not detected above 10 feet or below 15 feet.

- Tank 4T is a 37+ year old, 500 gallon auto waste oil tank located near the southeast corner of Building 20 (see Figure C6-2 in Appendix A). Organic compounds were found in Boring 4TW at 5 feet with a concentration of 42 mg/kg (ppm). An obstruction at 7 feet prevented further drilling at 4TW. Evidence of organic compounds was not found at Boring 4TB.

- Tank 10T is a 35+ year old, 10,000 gallon wastewater tank located between the bottle storage house and the steam cleaning area (see Figure C6-3 in Appendix A). Organic compounds were found at 10 and 20 feet with concentrations ranging from 13 to 15 ug/kg (ppb). Field data do not indicate the presence of organic compounds below 20 feet.

- Tank 15T is an 8-year old, 2,000 gallon tank located between Buildings 1 and 36 (see Figure C6-5 in Appendix A). The tank was originally designed for spill containment, but is currently being used to hold alkaline soaps. Organic compounds were found at 10, 15, and 20 feet with concentrations ranging from 11 ug/kg (ppb) to 6,300 mg/kg (ppm). Field data indicate that organic compounds may extend below 40 feet.

- Tank 17T is an 8-year old, 5,000 gallon 1,1,1-trichloroethane tank located between Buildings 1 and 36 (see Figure C6-5 in Appendix A). Organic compounds were found at 10, 20, and 30 feet with concentrations ranging from 7 ug/kg (ppb) to 840 mg/kg (ppm). Field data indicate that organic compounds may extend below 30 feet.

- Sump 22S is a 24-year old, 500 gallon waste oil concrete sump. Sump 22S is situated east of the washdown booth at building 36 (see Figure C6-7 in Appendix A). Petroleum hydrocarbons were found at 5 feet with a concentration of 1,400 mg/kg (ppm). soil

samples and field data at 10 and 15 feet do not indicate the presence of organic compounds below 5 feet.

Laboratory analyses of soil samples indicated the presence of organic compounds at 5 tanks and 1 sump. Two of these locations (4T and 10T) had low organic compound concentrations (maximum of 0.15 ppm toluene at 10T and 42 ppm of petroleum hydrocarbon at 4T) in the soil, and do not pose an environmental threat. Tanks 4T and 10T are scheduled for removal which will remove them from the UST monitoring program. The remaining 4 locations (2T, 15T, 17T, and 22S) had petroleum hydrocarbon and volatile organic compound concentrations at levels requiring further action.

no further action

- ? I meaning threat ?

Tank 2T is also scheduled for removal and replacement with a double-wall tank. The soil with elevated concentrations of organics in the 2T and 4T area will be excavated and replaced with clean fill material during tank removal operations. Tank 4T will be replaced with an aboveground storage container.

Tanks 15T and 17T have volatile organics in the soil ranging in concentration from 10 to 6,300 mg/kg. The total vertical depth of organics is not known at this time. The lateral and vertical extent of organics in the soil at Tank Cluster 15T-18T will be evaluated as described in the draft work plan entitled "Douglas Aircraft Company Torrance (C6) Facility Phase III Groundwater and Soil Investigation Work Plan" revised 9 February 1989.

Sump 22S had a petroleum hydrocarbon concentration of 1,400 mg/kg at 5 feet. This sump is not scheduled for removal or replacement, and will be evaluated as described in Section 3.0.

In summary, of the six tanks and sumps found with organics in the soil from the Phase III drilling program (August 1987), only Sump 22S will be addressed under this work plan. Table 3 summarizes the status of the tanks and sumps identified with organics in the soil.

2.0 OBJECTIVE

The objective of this work plan is to present a method of evaluating the lateral and vertical extent of organics in the soil at the 22S sump location identified during the Phase III drilling program (August 1987). This work plan will also present a method of assessing and developing soil remedial alternatives for the area, if remediation may be necessary. Ok, but inconsistent w/ prior statement

3.0 APPROACH

This section will outline WCC's investigative approach for Sump 22S. The location of 22S is illustrated in Appendix A. Appendix B describes general field procedures and methodologies.

Sump 22S is a 24-year old, 500-gallon waste coolant oil concrete sump. Soil samples from a single boring indicate the presence of organic compounds to a depth of 5 feet, however, no organics were found at 10 and 15 feet.

WCC proposed the following approach:

- Evaluation of the piping configuration of 22S.

TABLE 3

STATUS OF TANKS AND SUMPS WITH
ORGANICS IN THE SOIL

Tank No./Sump	Status	Comments
2T	Removed	
4T	Replaced	
10T	Scheduled for removal	Soil concentrations in ppb range and does not warrant remediation
15T-18T (cluster)	In operation	Soil investigation is planned under the C6 Phase III ground water and soil investigation
22S	In operation	Further evaluation required

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- Installation of one additional 20- to 30-foot soil boring slant drilled beneath 22S. Soil samples will be collected at the surface and at 5-foot intervals. Figure C6-7 in Appendix A shows the proposed boring location.

- Evaluation and recommendation of a leak detection option based on lateral and vertical extent of organics in the soil and ~~new Federal regulation underground storage tank~~. Options may include, 1) sump replacement and soil excavation; 2) no-action with sump relining; and 3) no-action.

4.0 SCHEDULE AND FINAL REPORTING

Woodward-Clyde Consultants proposes completing this investigation within 4 weeks of receiving authorization from Douglas Aircraft Company to proceed, following review of the work plan by the Regional Water Quality Control Board. Upon completion of the investigation, a written report will be submitted presenting the results and final recommendations.

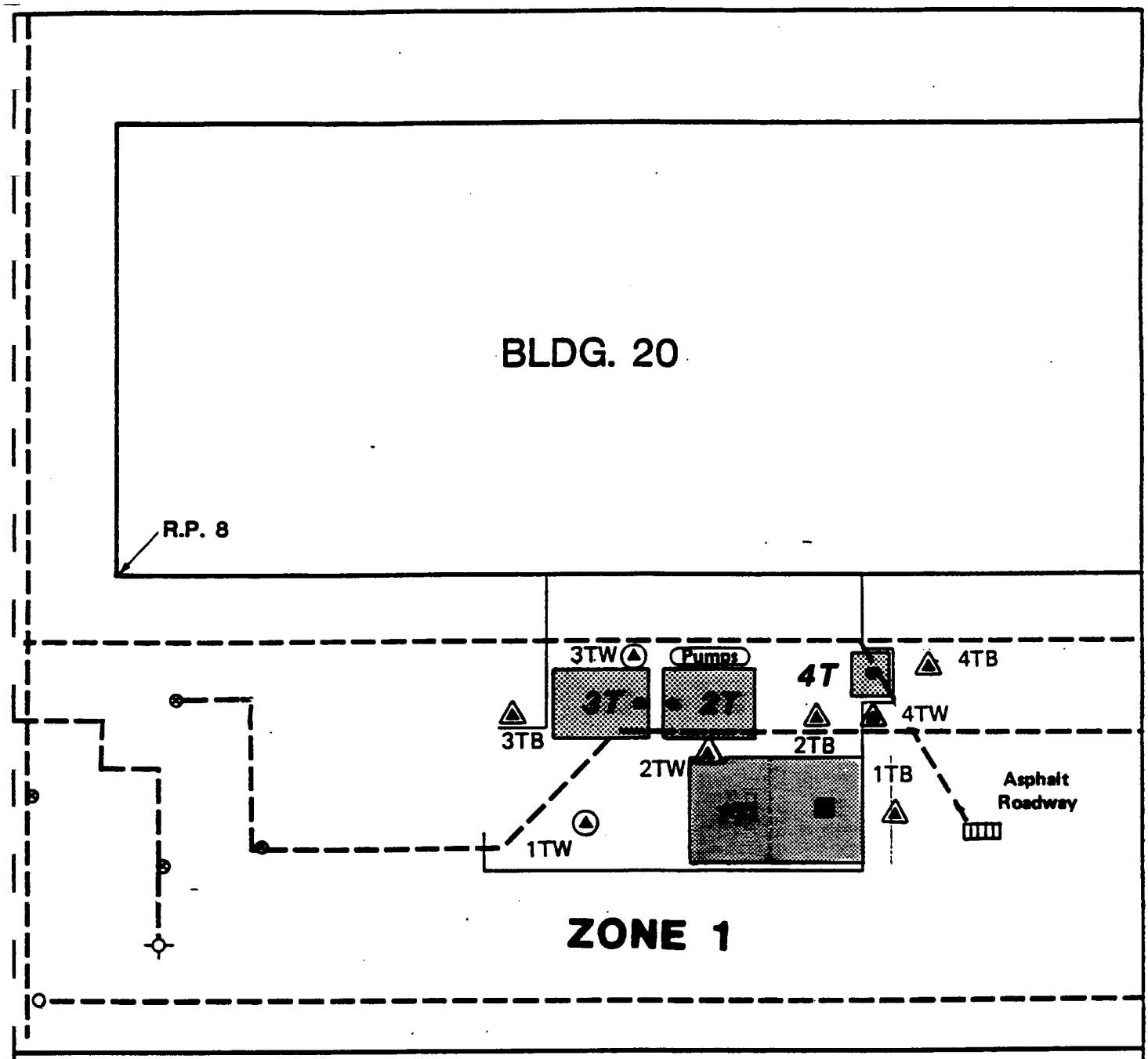
5.0 BUDGET

A cost breakout for each task of the 22S investigation is shown below. The budget represents the costs for field activities, laboratory analysis, and evaluation of options.

Task 1 - Mobilization/Field Program	$2,500
Task 2 - Evaluate and Recommend Options	2,000
Task 3 - Preliminary Report Preparation	1,200
Final Report Preparation	400
ESTIMATED COST	**$6,100**

APPENDIX A

TANK/SUMP LOCATIONS



0 10 20

SCALE, feet

NOTES:

1. Underground utilities (water and sewer) supplied by Douglas Aircraft. Utilities are shown only within approximately 30 feet of the tank/sump.
2. The surface material is a concrete pad surrounded by asphalt.
3. No restrictions other than those shown.

October 1987

Project: DOUGLAS AIRCRAFT CO. Project No. 8741863C-PHASE III	BORING AND WELL LOCATION MAP FOR TANKS 1T TO 4T	Fig. C6-2

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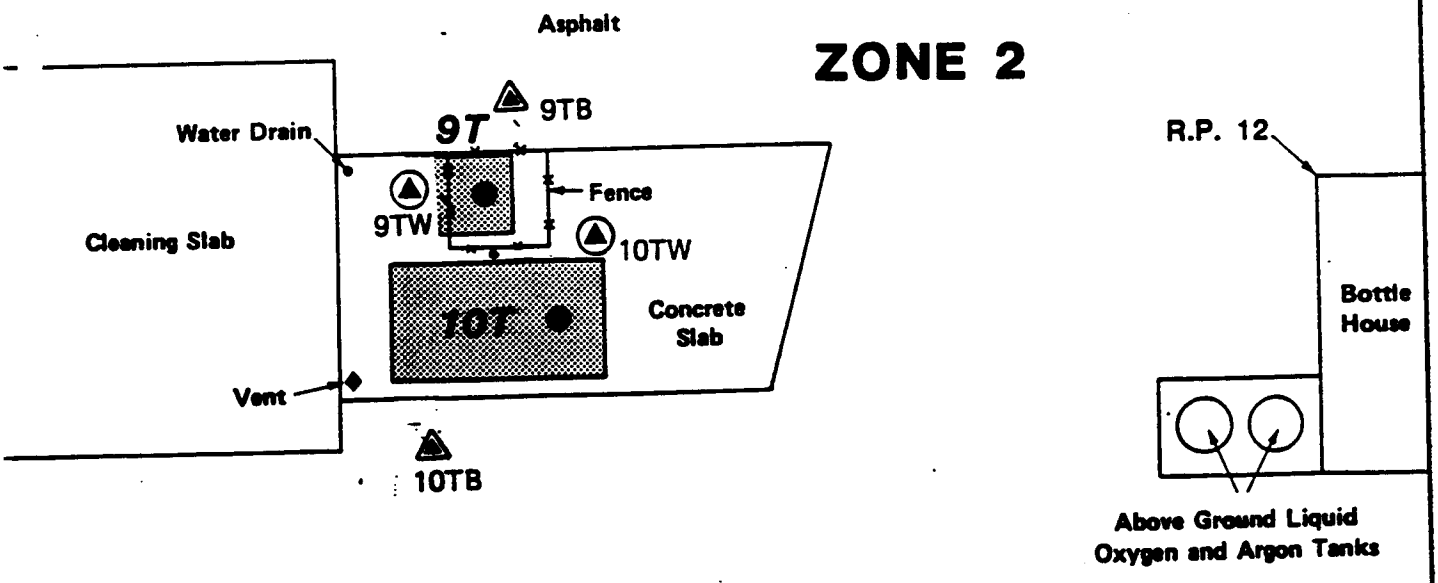
ZONE 2



0 10 20

SCALE, feet

NOTES:

1. Underground utilities (water and sewer) supplied by Douglas Aircraft. Utilities are shown only within approximately 30 feet of the tank/sump.
2. The surface material over tanks 9 and 10 is concrete with asphalt surrounding.
3. No restrictions other than those shown.

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oject: DOUGLAS AIRCRAFT CO. oject No. 8741863C-PHASE III	BORING AND WELL LOCATION MAP FOR TANKS 9T AND 10T	Fig. C6-3

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APPENDIX B
FIELD PROCEDURES AND METHODOLOGY

the sampling depth by dropping a 140-pound hammer approximately 30 inches. The number of blows (blow count) required to advance the sampler 1 foot will be recorded on the boring logs.

B.2.1 OVA Headspace Measurements

Field OVA headspace measurements will be taken from one of the soil samples collected at each sampling depth. This procedure is conducted by extruding the contents of one of the four brass tubes into a 1-pint glass jar. The jar's lid has a 1/4-inch diameter hole, which is sealed with duct tape. Organic vapors from the soil are allowed about 10 minutes to reach equilibrium inside the jar before an OVA probe is inserted through the hole into the jar and the vapor concentration is measured (in ppm).

B.2.2 Soil Sample Preparation

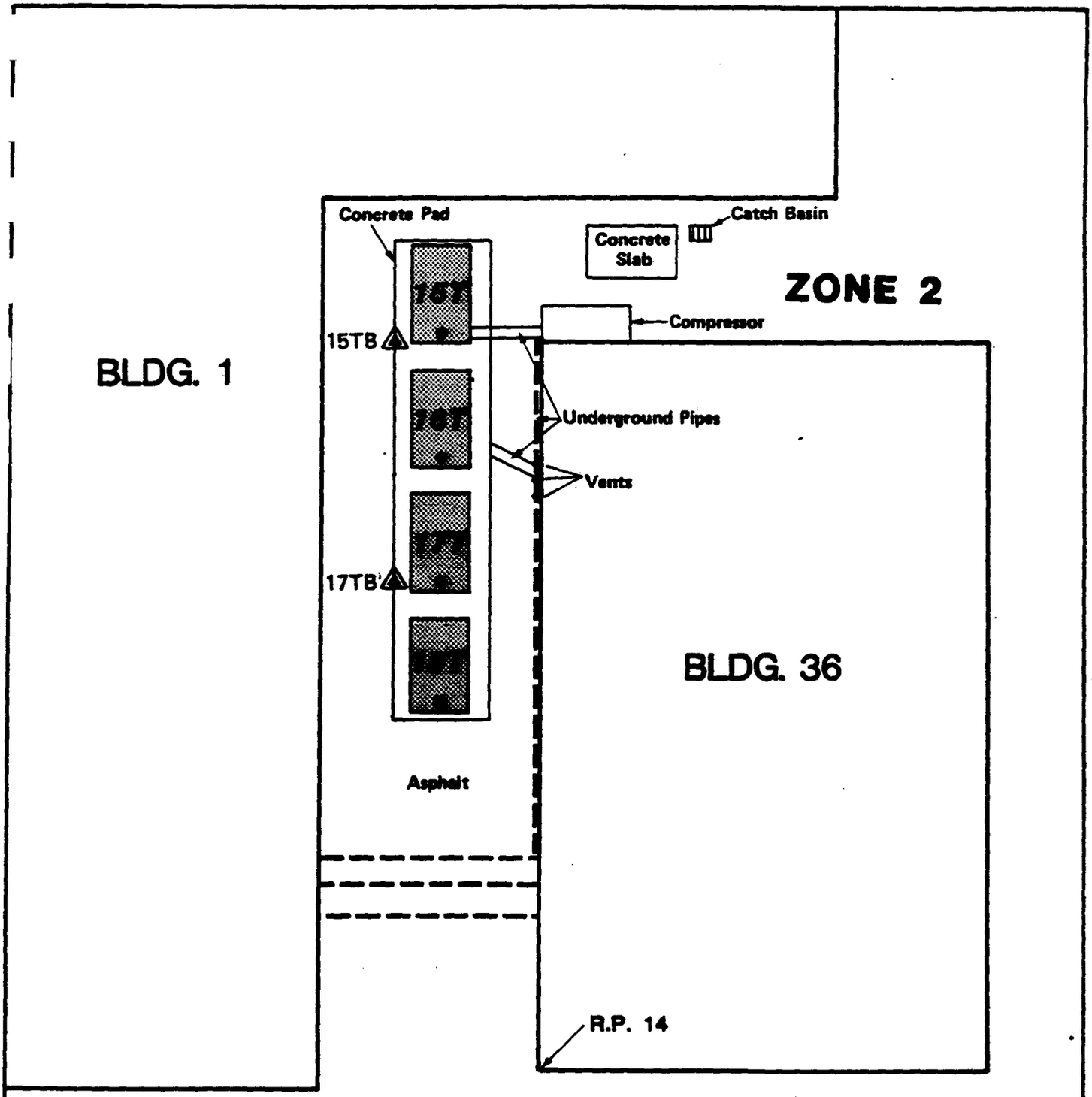
One or two tubes from the soil sampler will be prepared for laboratory analysis. The ends of the tubes will be covered with aluminum foil and plastic end caps and then sealed with electrical tape. Soil samples will be labeled with the following information:

- Project number
- Project name
- Boring number
- Sample number
- Soil depth
- Sampling date
- Person collecting sample

The soil samples will then be sealed in Ziploc plastic bags and placed on ice in a cooler. All soil samples will be delivered to a state-certified analytical laboratory for analysis. Chain-of-custody procedures, including the use of sample identification labels and chain-of-custody forms, will be used for tracking the collection and shipment of soils samples.

B.3 FIELD OBSERVATIONS

Observations will be made and recorded on boring logs by Woodward-Clyde Consultants (WCC) personnel during the drilling and sampling operations. These observations will relate to visual soil classifications, geologic and stratigraphic comments, observation well construction details, sampling efforts, OVA measurements, and other pertinent information.



NOTES:

1. Underground utilities (water and sewer) supplied by Douglas Aircraft. Utilities are shown only within approximately 30 feet of the tank/sump.
2. The surface material over the tanks is concrete with asphalt surrounding.
3. No restrictions other than those shown.

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Project: DOUGLAS AIRCRAFT CO. **Project No.** 8741863C-PHASE III	BORING AND WELL LOCATION MAP FOR TANKS 15T TO 18T	Fig. C6-5

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